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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,001	10/17/2003	Tetsuya Tada	TI-32473.1	4401
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TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			NGUYEN, LONG T	
			ART UNIT	PAPER NUMBER
			2816	

DATE MAILED: 06/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/688,001	Applicant(s) TADA, TETSUYA	
	Examiner Long Nguyen	Art Unit 2816	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 7-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 7-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 May 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/314,833.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings were received on 5/9/05. These drawings are not accepted because the replacement sheet is informal.

New corrected formal drawings in compliance with 37 CFR 1.121(d) are required in this application because the replacement sheet filed on 5/9/05 is informal. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Objections

2. Claims 1 and 7-9 are objected to because of the following informalities:

Claim 1, lines 2 and 4, "supply element" should be changed to --supply terminal-- so that the claim language is consistent with each other (for example, see line 6 of claim 1).

Claim 7, line 6, "a second current source" should be changed to --a first current source-- to provide antecedent basis for recitations in claim 8 (see line 5 of claim 8).

Claim 7, line 6, "the fourth MOS" should be changed to --the first MOS-- (see line 3 of claim 7).

Claim 8, line 3, "the reference potential" should be changed to --a reference potential--.

Claim 8, line 4, "transistor, being an NMOS transistor" should be changed to --transistor, wherein said first MOS transistor is a first NMOS transistor-- to provide antecedent for the first NMOS recited on line 6 of claim 8.

Art Unit: 2816

Claim 8, line 11, "the common" should be changed to --a common-- to avoid of lacking antecedent basis.

Claim 8, line 10, "between" should be changed to --of--.

Claim 9, line 3 "the third PMOS" should be changed to --the first PMOS-- (see line 7 of claim 8).

Claim 9, line 3, "the fifth NMOS" should be changed to --the second NMOS-- (see line 4 of claim 8).

Claim 9, line 4, "resistance terminal" should be changed to --resistive element--.

Claim 9, line 5 "the third PMOS" should be changed to --the first PMOS--.

Appropriate correction is required.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1 and 7-9 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,710,632. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 (Col. 11, lines 37-47) of the U.S. Patent 6,710,632 recites all of the limitations of claim 1

Art Unit: 2816

of the instant application. In particular, claim 1 of U.S. Patent 6,710,632 recites a drive circuit (Col. 11, lines 37-47) comprising a current output MOS, a drive part, and a clamp circuit as recited in claim 1 of the instant application.

With respect to claims 7-9 of the instant application, claim 1 of the U.S. Patent 6,710,632 discloses all of the limitations of these claims except for the drive part includes a first MOS transistor, wherein the first MOS transistor is a first NMOS transistor; a second NMOS transistor, a first current source, wherein the first current source comprises a first PMOS transistor and a second PMOS transistor; a second current source; a first resistive element and a second resistive element as recited in the claims. However, Figure 7 of the prior art of the U.S. Patent 6,710,632 discloses a drive part (QP5, QP6, R3, R34, R4, QN7, QN8, INV1) includes a first MOS transistor (QN8), wherein the first MOS transistor is a first NMOS transistor (QN8); a second NMOS transistor (QN7), a first current source (QP5-QP6), wherein the first current source comprises a first PMOS transistor (QP4) and a second PMOS transistor (QP6); a first resistive element (R3) and a second resistive element (R34) for the purpose of limiting punch-through current during switching (Col. 3, lines 6-8) and thus reducing power consumption of the circuitry. Thus, it would have been obvious to one skill in the art to use the specific drive part as in Figure 7 of the U.S. Patent 6,710,632 for the drive circuit of claim 1 of U.S. Patent 6,710,632 for the purpose of reducing power consumption of the circuitry. Thus, this modification meets the limitations of claim 7 of the instant application.

Note that, with respect to claims 8 and 9, the above modification as discussed meets all the limitations of claim 8 of the instant application except for a second current source connected between the source terminal of the first NMOS transistor and a reference potential. However,

Art Unit: 2816

Figure 6 of the prior art of U.S. Patent 6,710,632 discloses a drive part (all elements in Figure 6 except for the resistor R2 and transistor QN6) including a second current source (IS2) connected between the source terminal of the first NMOS transistor (QN5) and a reference potential (ground) for the purpose of controlling and limiting punch-through current during switching of the circuitry (Col. 2, lines 65-67) and thus controlling and reducing the power consumption of the circuitry. Therefore, it would have been obvious to one having skill in the art at the time the invention was made to modify the above combination by providing the drive circuit in Figure 7 of U.S. Patent 6,710,632 with a second current source (IS2) connected between the source terminal of the fourth NMOS transistor and ground, as taught in Figure 6 of the U.S. Patent 6,710,632, for the purpose of reducing and controlling the power consumption of the circuitry. Thus, the limitations of claims 8 and 9 of the instant applicant are also met.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Yokosawa (USP 6,294,941).

With respect to claim 1, Figure 1 of the Yokosawa reference discloses a drive circuit to supply drive current to a load resistor (9-10) that is connected to first power voltage supply element (52), which includes: a current output MOS transistor (8) connected in series with the load resistor (9-10), a drive part (1) that is connected to a second power voltage supply element

Art Unit: 2816

(51) and that supplies a drive signal (A) to the gate terminal of the current output MOS transistor (8), and a clamp circuit (28) that is connected to the second power voltage supply terminal (51) to hold the drain terminal of the current output MOS transistor at a predetermined potential (Col. 6, lines 24-40).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Yokosawa (USP 6,294,941).

With respect to claim 1, Figure 7 of the applicant's admitted prior art discloses a drive circuit to supply drive current to a load resistor (R5) that is connected to a first power voltage supply (Vcc2), which includes: a current output MOS transistor (QN9) connected in series with the load resistor, and a drive part (all elements in Figure 7 except for the resistor R5 and transistor QN9) that is connected to a second power supply voltage (Vcc1 or ground) and that supplies a drive signal (ND3) to the gate terminal of the current output MOS transistor. Figure 7 of the applicant's admitted prior art does not disclose that the drive circuit including a clamp circuit that is connected to the second power voltage supply terminal to hold the drain terminal of the current output MOS transistor at a predetermined potential. However, the Yokosawa reference discloses in Figure 1 a circuit that including a clamp circuit (28) for the purpose of limiting the gate-source voltage of the output MOS transistor so as to prevent it from exceeding a

Art Unit: 2816

predetermined voltage level (Col. 6, lines 29-40). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to provide the drive circuit in Figure 7 of the applicant's admitted prior art with the clamp circuit 28 in Figure 1 of the Yokosawa reference for the purpose of limiting the gate-source voltage of the output MOS transistor so as to prevent it from exceeding a predetermined voltage level (Col. 6, lines 29-40). Thus, this combination meets all the limitations of claim 1.

With respect to claim 7, Figure 7 of the applicant's admitted prior art in the above modification shows that the drive part includes a first MOS transistor (first NMOS QN8) connected to the gate terminal of the current output MOS transistor (QN9) and that supplies the drive signal to the current output MOS transistor, and a first current source (current mirror QP5-QP6) that supplies current to the first MOS transistor (first NMOS QN8).

With respect to claim 8, the above combination as discussed above meets all the limitation of this claim except for the drive part including a third current source is connected between the source terminal of the first NMOS transistor (QN8) and the reference potential ground. However, Figure 6 of applicant's admitted prior art discloses a drive part (all elements in Figure 6 except for the resistor R2 and transistor QN6) including a second current source (IS2) connected between the source terminal of the first NMOS transistor (QN5) and ground for the purpose of controlling the limiting punch-through current during switching of the circuitry (see lines 22-23 on page 4 of the instant specification) and thus controlling and reducing the power consumption of the circuitry. Therefore, it would have been obvious to one having skill in the art at the time the invention was made to modify the above combination/modification by providing the drive circuit in Figure 7 of the applicant's admitted prior art with a second current

Art Unit: 2816

source connected between the source terminal of the first NMOS transistor (QN8) and ground, as taught in Figure 6 of the applicant's admitted prior art, for the purpose of limiting punch-through current during switching of the circuitry and thus reducing the power consumption of the circuitry, i.e., connecting a second current source between the source terminal of the first NMOS (QN8) transistor and ground (GND) in Figure 7 of the applicant's admitted prior art. Thus this modification meets all the limitation of claim 8 because the modification now discloses a circuit wherein the drive part now including: a second current source (IS2 as modified as discussed) that is connected between the source terminal and the reference potential of the first MOS transistor (first NMOS QN8), and a second NMOS transistor (QN7) that is connected between the second current source (QP5-QP6) and the reference potential (GND) and that operates complementarily with the first NMOS transistor (QN8), and the first current source (QP5-QP6) includes a first PMOS transistor (QP5) that is connected between the second power supply voltage terminal and the second NMOS transistor (QN7) and whose gate terminal and drain terminal are connected together, and a second PMOS (QP6) transistor that is connected between the second power supply terminal and a common connection point (ND3) between the gate terminal of the current output MOS transistor and the first NMOS transistor (QN8), and whose gate terminal is connected to the gate terminal of the first PMOS transistor.

With respect to claim 9, Figure 7 of the applicant's admitted prior art in the above modification shows that the drive part has a first resistive element (R3) that is connected between the drain terminal of the first PMOS transistor and the drain terminal of the second NMOS transistor, and a second resistance element (the resistor connected to the current mirror with

Art Unit: 2816

transistor QP5) that is connected between the second power supply voltage terminal and the gate terminal of the first PMOS transistor.

Response to Arguments

9. Applicant's arguments filed on 5/9/05 have been fully considered but they are not persuasive.

Applicant submitted that claims 1 and 7-9 are amended so that they are free from informalities. However, the claims still includes informalities set forth above, and appropriate correction is required.

With regard to the double patenting, applicant argues that the instant application is a divisional of 10/314,833, and that by asserting a restriction requirement and requiring a divisional, the Patent Office cannot now enforce a double patenting rejection. However, this argument is not persuasive because no restriction was made in the parent applicant 10/314,833. Thus, it is proper to make double patenting rejection

Applicant argues that Yokosawa does not disclose that the clamp circuit to hold the drain terminal of the current output transistor at a predetermined potential, and that the clamp circuit 28 of Yokosawa clamps the gate potential of the source follower transistor 8. However, this argument is not persuasive because clearly that the clamp circuit 28 of Yokosawa clamps the gate potential of the source follower transistor 8 so that the gate to source of the transistor 8 is held to a first predetermined potential (Col. 6, lines 24-40) to bias the gate of transistor 8, so the turn-on resistance of the transistor 8 is a predetermined value, and thus the drain terminal of the transistor is held at a second predetermined potential. Furthermore, in operation of the circuitry of Figure 1 of Yokosawa, the reference potential V_{ref} is a fixed voltage, and when the power

Art Unit: 2816

supply VBATT is fixed then the circuit of Figure 1 is generated a constant voltage at the output Vout (drain of transistor 8).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directly to Examiner Long Nguyen whose telephone number is (571) 272-1753. The Examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Callahan, can be reached at (571) 272-1740. The fax number for this group is (703) 872-9306.

Art Unit: 2816

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 22, 2005



LONG NGUYEN
PRIMARY EXAMINER